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ABSTRACT

Vocational education and training (VET) research in Australia has changed dramatically in the last 10 years. In a 1993 report titled "No Small Change," VET research was characterized as a fragmented activity that was underfunded and had little or no relevance to policy or practice in the VET sector. Since that time, increased funding through the Australian National Training Authority (ANTA) has been highly successful in increasing the overall quantity of research. The quality of research, however, will determine whether governments continue to fund the research effort. Relevance, timeliness, objectivity, and methodological integrity are the hallmarks of high quality research in applied fields such as VET. This involves both users and researchers becoming much more involved with the research management process. Users need to be clear about what issues should be addressed and the standards they expect from that research. Researchers need to examine their own practices to ensure that research is meaningful and builds on the work of others. This more demanding regime for VET research demands new skills from researchers and the development of research training programs that ensure the continuing supply of those skills into the VET research community. (Contains 10 references.) (KC)

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Never mind the width, feel the quality: improving VET research in Australia

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The vocational education and training (VET) research landscape has changed dramatically in the last ten years. In 1993, Rod McDonald and his colleagues at the University of Technology Sydney (UTS) described the state of VET research at that time in their landmark report *No small change* (McDonald et al 1993). In the report, they characterised VET research as a fragmented activity that was underfunded and had little or no relevance to policy or practice in the VET sector.

The perceived shortcomings of VET research in Australia are that:

- current research is fragmented;
- there is little fundamental and general issues-based research in VET;
- the research that has been carried out is not fully used;
- the big issues in vocational education and training need much more intensive research; and
- there is no strong critique of VET policies and programs.

This review might have been yet another report on some area of research that remained on dusty shelves. However, *No small change* had a significant and immediate impact on VET research. McGaw (1996) compares the success of *No small change* to the relative failure of the 1992 Australian Research Council (ARC) review of educational research in Australia (McGaw et al 1992). As McGaw shows, the success of the *No small change* report reflected the engagement of the VET sector in the review from the beginning. Sponsored by VEETAC, McGaw shows that the review was underpinned by a pre-existing belief within key stakeholders in the VET sector of the value of research to inform the rapid policy development that was occurring at the time. The publication of the report also coincided with the establishment of the Australian National Training Authority (ANTA) in 1993 with a brief to oversee the development of the sector. The presence of this single powerful agency meant that the report's recommendations for a large increase in national funding for VET research could be acted upon quickly, in contrast to the general ARC review, whose recommendations for similar action were considered by a large number of agencies, none of whom had sole responsibility for action.

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The main result of *No small change* was the establishment in 1994 of the ANTA Research Advisory Council (ANTARAC) with a brief to fund VET research on a nationally competitive basis. ANTARAC was highly successful in increasing the quantum of VET research carried out in Australia and in setting some strategic directions for research.

In 1997, ANTARAC was succeeded by the national managed VET research and evaluation program, commonly known as the NREC program after the National

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Research and Evaluation Committee established to oversee its activities. At the same time, ANTA established a program of national key centres for VET research to enable concentrations of expertise in VET to be funded to undertake three-year programs of research into specific aspects of VET policy and practice. Three centres at UTS, Monash University and the University of Tasmania were initially funded in 1997, with a fourth established at Melbourne University and Royal Melbourne Institute of Technology in 2000. The work of the centres has been very important in building research capacity in VET as well as in exploring major issues in the VET sector such as the economics of VET and workplace learning. This paper, however, will focus on the research carried out under the NREC program.

From the beginning, NREC has adopted a strategic approach to research funding. One of the first activities undertaken by NCVER as manager of the NREC program was the development of a national strategy for VET research (National Centre for Vocational Education Research 1997). Published in late 1997, the first national strategy drew on an extensive series of consultations with the principal stakeholders in the VET system to identify six priority areas for research including:

1. Economic and social implications of VET
2. Employment and the workforce
3. Pathways from school to work
4. Outcomes from VET
5. Quality of VET provision
6. Future issues affecting the VET sector.

Within these broad priority areas, NREC has also attempted to cluster research around specific themes and questions. The logic of this process of clustering research has been to draw on the expertise of a number of different research teams, and approach research questions from a variety of methodological and epistemological angles. The result is that research themes can be explored in the round, with no one point of view dominating the subsequent analysis. Table 1 identifies the main thematic clusters that have been funded under the NREC program from 1997-2000 and the number of projects funded under each theme.

Table 1: Main NREC thematic clusters of projects (1997-2000)

Theme	Numbers of projects
Changes in work and the labour market	24
Access and equity	18
Apprenticeship and traineeships	16
Delivery of VET	16
Competency-based training and assessment	15
Outcomes of VET	13
Workplace skills	13
VET practitioners	12
VET and schools	9
Economics and funding of VET	8
Adult and lifelong learning	6

Adult and lifelong learning	5
International comparisons	4
Management of VET	4

A further motif in the NREC program has been to consciously extend the range of researchers involved with the program and, in particular, to encourage the participation of researchers from the VET sector. This has enjoyed some limited success. Table 2 shows that the number of submissions received by NREC from VET providers has nearly tripled from 14 in 1998 to 36 in 2000. Success rates have also been improving, with VET providers scoring around 20% success rates in 2000 compared to the university rates of 18%. This reflects two decisions on the part of NREC in 2000. Firstly, to encourage proposers to include researchers from providers on their research teams, particularly when bidding for projects which involve investigation of providers, and secondly, a movement in the research priorities towards issues that impact on practice as well as policy, such as the development of the VET professional and the impact of online delivery in VET.

Table 2: NREC proposals by source (1998-2000)

2000			
Submissions received from	**No. of proposals**	**% of total (n=185)**	**No. successful**
Universities	89	48	16
TAFE institutes/private providers	36	19	7
Private consultants	46	25	7
Government departments	7	4	1
Industry	7	4	
Other	-	-	
Total	**185**	**100**	**31**
1999			
Submissions received from	**No. of proposals**	**% of total (n=176)**	**No. successful**
Universities	82	47	28
TAFE institutes/private providers	22	13	2
Private consultants	56	32	9
Government departments	11	6	
Industry	3	2	
Other	2	1	
Total	**176**	**100**	**39**
1998			
Submissions received from	**No. of proposals**	**% of total (n=131)**	**No. successful**
Universities	47	36	9
TAFE institutes/private providers	14	11	3
Private consultants	60	46	5

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Government departments	4	3	
Industry	5	4	
Other	1	0.8	
Total	**131**	**100**	**17**

A final characteristic of the NREC program has been the emphasis on quality through peer and practitioner review of projects as they progress. Sequenced payments for projects are attached to reviews of interim reports scheduled through the life of the project, with the final payment dependent on review of the final report. This has proved to be a very successful strategy for ensuring that research projects meet the objectives established in the proposal and the contract, as well as helping research teams to meet the deadlines on projects. Peer review at early stages in the life of the project enables researchers to check the viability of methodology before undertaking the empirical stage of work, and latterly to ensure that the analysis of data meets the needs of the research question(s).

This, of course, is a very different approach to national research funding than that traditionally adopted by the big research agencies such as the Australian Research Council (ARC) and the National Health and Medical Research Council. Under these schemes, research is investigator driven. There has been little or no attempt to define the key national research questions let alone develop a national strategy for research in the past, although both agencies are now seriously examining the prospects for the development of national research strategies. The quality of research is assured through a highly competitive, if rather laborious, process of extensive peer review of project proposals, inviting large numbers of both national and international reviewers. After projects have been funded, there is little follow-up and almost no review until results are published in refereed journals, when they are scrutinised through the normal journal review procedures. Moreover, after the research is completed there is little or no attempt to disseminate findings to users, except through the usual academic channels of refereed journals and occasionally monographs. This represents a supply-side model of research in which research issues are framed by the researchers themselves and quality assurance is an entirely front-end process.

NREC is clearly demand-side driven, taking its cue from extensive consultations within the sector, including researchers and developing key themes around which research can be clustered. The priorities are developed into a national VET research and evaluation strategy which informs the process of research funding on a three-year rolling basis. However, researchers have a key role to play in the process. Proposals addressing research priorities are framed by researchers; and questions and methodology research teams are all developed by researchers, with NREC deciding which of the submissions best meets the needs of the research agenda at the time. NREC also run a large 'open' category for investigator-driven proposals, which regularly attract around 25% of the available funding in each round. Quality is built in throughout the research process, not simply as an 'add on'. NREC research projects are required to produce up to two interim reports before the final report. At each of these stages, reports are independently peer reviewed and researchers are obliged to modify their work in the light of reviewers' comments. Finally, NREC places a very high priority on wide dissemination of research results through a

variety of media. This issue is discussed below. Table 3 summarises the differences between supply and demand side approaches to research.

Table 3: Supply and demand side approaches to research

Supply side	Demand side
Investigator driven	User driven
Few priorities for research	Priorities set through a national strategy
Quality control at proposal stage	Quality control exercised throughout research process
Upfront peer review	Ongoing quality process
No dissemination	High emphasis on dissemination

Making use of research

Perhaps the most striking difference between the NREC program and other national competitive granting agencies is the emphasis on dissemination and the utilisation of research. Arrangements for dissemination are an integral part of the NREC contract with ANTA, and a substantial proportion of the funds available go towards ensuring that the message from research gets out to the VET community and to those who will use it. As Robinson and Hayman (2000) have described, the process of dissemination goes well beyond the traditional research report. In particular, effective dissemination involves the synthesis of research results into short publications that can be easily accessed and used by those in the sector. This is also an approach that is being developed by similar research agencies in other parts of the world, including the National Dissemination Centre for Career and Technical Education in the United States. NCVER has developed a number of these synthesis publications.

Research at a glance: a short publication on research themes, which summarises the research and statistical information on particular theme areas such as apprentices and trainees, student outcomes, early school leavers and so on.

Insight: a regular 'newsletter' summarising the findings of key VET research released by the NCVER or other research bodies.

Email newsletter: an electronic newsletter with advance warning of important research just or about to be released.

These publication-based forms of dissemination can be very effective in reaching large numbers of people quickly. However, they are essentially a passive means of dissemination. These media require the user to come to the research, rather than engage with the message. Active dissemination, on the other hand, brings the research to the subject and attempts to engage the user. This involves a two-way process of encouraging debate about the results of research, and leading people to think about and integrate the message from research into their work. For this to

occur, face-to-face communication on research is essential. Thus, NCVER has sponsored small-scale seminars and briefings for researchers and decision-makers in the sector, which allow the results of research 'clusters' to be discussed and explored. Larger, public forums organised around research themes such as the impact of competency-based training or the implications of the changing nature of work for VET have also been very successful in bringing diverse groups of stakeholders together to investigate what research means for the ways in which they operate.

However, dissemination is only part of the answer to the question of how research is utilised in VET. Making people aware of research findings or of the value of research in general does not ensure the utilisation of specific research findings, particularly in the politicised environment of policy-making. Here, ways have to be found to 'inject' appropriate research into the policy-making process. This requires researchers to gain credibility and access to decision-makers that will introduce research into policy processes. An example of injecting research into policy making in this way is provided by the Commonwealth government's National Skills Initiative since 1999. This process involved the establishment of a series of industry-led working parties to investigate reported skills shortages in traditional trades areas such as metals, electro-technology and rural occupations. Organised through the federal Department of Education, Training and Youth Affairs, the working parties comprised industry representatives and government officers. NCVER was invited to these working parties as a source of independent research-based advice (National Centre for Vocational Education Research 2000). Drawing upon research carried out on the apprenticeship and traineeship system as well as on the changing nature of work, returns to training investments and on the implications of demographic change for VET, NCVER were able to exert a critical influence on the deliberations of the working parties. Instead of commonly held assumptions about the training system dominating discussions on the sources of and answers to perceived problems of skills shortages, the research input was able to locate the nature of the problem more effectively and demonstrate that new solutions other than taking on more apprentices or opening up the immigration program were needed.

In a new applied field of research such as VET, it is imperative that researchers find ways such as this of getting the research message to the right people at the right time and in a way they can digest quickly and use. In line with the changing nature of work, research needs to be based on a 'just-in-time' principle, rather than the current 'just-in-case' principle that dominates so much of the supply-side approach to research.

The quality of VET research

If the last seven years since the formation of ANTARAC have been concerned with improving the quantum of research in VET, the next few years need to be concerned with the quality of research. As industry discovered in the 80s and 90s, consumer preference is determined by quality rather than by quantity or price. At the risk of drawing heretical parallels with the world of everyday work, research may be seen simply as another service with its own set of consumers. For research to be used by its potential consumers it has to be both relevant and of high quality. In the NREC program, relevance is assured through the directed nature of the program. However, quality is a far more contentious issue. From the research consumer's point of view, conventional measurements of the quality of research can often be quite meaningless.

In a recent review of the quality and relevance of Australian educational research, Phelan (2000) concludes that Australian researchers are highly productive and highly relevant in their work. With 0.3% of the world's population, in 1995 Australian educational researchers produced 4% of the world's research published in major international journals, but with citation rates that vary between 2.5% and 5%. This suggests a high general level of production of international quality research. But this means little for the quality of individual research projects, many of which go unreported in the international educational journals or take years to get into print.

A more rigorous approach to the problem of quality in educational research was taken by the controversial review of educational research in Britain undertaken by Ofsted, the Office for Standards in Education (Tooley and Darby 1998). The review was in response to comments by Professor David Hargraves (1996) that in Britain there was a considerable amount of:

> Frankly second-rate educational research which does not make a serous contribution to fundamental theory or knowledge; which is irrelevant to practice; which is unco-ordinated with any preceding or follow-up research; and which clutters up academic journals that virtually nobody reads. (p 7)

Although the Ofsted review was concerned with general educational research, its method may be applied to the more specialised field of VET research. Examining more than 200 articles published in the top four British educational refereed journals over the period 1994-1996, the review highlighted four key problem areas for quality in educational research. These problems have also surfaced in NREC-funded research and proposals for research in the last four years.

Firstly, there is the problem of partisanship, whereby a researcher brings preconceptions to the research usually based on prior emotional or political judgements. These preconceptions may impact on the conduct of the research, biasing the methodology used by the researcher, but often they surface in the analysis of otherwise high quality data. In this situation, researchers draw spurious conclusions from data that does not support them. These problems are often picked up during the review of final reports of NREC, and require researchers to either review their analyses or to remove partisan comments from an otherwise objective commentary.

Secondly, there are problems concerned with methodology. This is the most common area for problems in the NREC corpus. Methodological problems begin at the proposal stage of the NREC process, with a large number of proposals simply not elaborating methodology satisfactorily or proposing methodologies that would not meet the research requirements posed by the questions to be investigated. Methodological inadequacy is the most common reason for failure to obtain an NREC grant. However, methodological problems can often plague projects through their lifetimes. The Ofsted review (1998), in a neat side-stepping of the issues of paradigms in VET research (McIntyre 1998), divided educational research into empirical - gathering and analysing primary data, and non-empirical - developing ideas or critiquing work based on previous research (not gathering primary data). They further divided empirical work into:

> Quantitative research: concerned with the acquisition and interpretation of data which can be analysed using statistical techniques and
>
> Qualitative research: involving the gathering of evidence that explores the significance, meaning, impact, individual or collective interpretation of events.
> (p 10)

Table 4 presents an analysis of NREC projects funded since 1997 by methodology. Two other categories have been added, representing the mixed methodologies that have become more common in recent years, involving both quantitative and qualitative approaches.

Table 4: Research funded by NREC – methodological type (1997-2000)

Year	Quantitative	Qualitative	Mixed – mostly qual.	Mixed – mostly quant.	Non-empirical	Total
1997	3	12	2	7	12	36
1998	2	6	1	2	11	22
1999	7	9	3	3	12	34
2000	3	12	2	6	8	31
Total	15	39	8	18	43	123
%	**12**	**32**	7	**15**	**35**	**100**

Of the empirical work, it is interesting to note that qualitative work predominates – a finding similar to the Ofsted survey of the UK research. However, quality issues arise with both forms of work. In quantitative work, survey design is the most frequently encountered problem in NREC projects. Reviewers and - where used - reference groups will usually pick up this problem early on, and with some work, survey design can be improved to ensure the quality of the methodology. In qualitative work, lack of rigour through inadequate triangulation is a key problem with NREC work, as it is in the Ofsted survey of the British research. There is still a tendency to rely on one method of data gathering such as interviewing, without attempts being made to verify the data gathered through alternative means. Typically this might take the form of relying on managerial accounts of training practices at the enterprise level, without verifying these often inflated accounts with workers who are the target of the training. Case studies of other organisations including providers are also often similarly flawed, rendering generalisation difficult.

The use of mixed methodologies has become increasingly important in NREC research. These usually involve both a quantitative and a qualitative element. Typically a mixed method approach would involve both surveys and case studies or interviews, and focus groups that support or develop the parameters for a more generalised survey. These are often very successful ways of approaching research questions. The quantitative element provides measurements of the extent of phenomena, whilst the qualitative element can provide explanatory power at the individual level. However, problems arise with mixed method approaches when the elements are not sufficiently complementary. Here epistemological questions come into play. The philosophical foundations of a positivist survey approach are very different from the interpretive roots of case studies or one-on-one interviews, and it is often not enough to simply include both quantitative and qualitative approaches in the one project without giving thought to how the two approaches can work together. Issues that arise from surveys may not be suited to further exploration from a more qualitative angle. As an example, the understanding that respondents may have of particular phenomena when filling in a survey may alter quite quickly in the course of a conversation with an interviewer, so that the interview is exploring a different phenomenon from the survey. These issues of compatibility of interpretation and data plague mixed method approaches, and are often not

sufficiently addressed by researchers in their proposals or in the final analysis of data for the project.

Thirdly, the Ofsted review discusses non-empirical research. From the table it is clear that non-empirical work has featured very strongly in the NREC program since its inception. This work is divided broadly into two types. Firstly, there are reviews of literature and research that summarise the extant research on particular themes and tease out the principal contours of the body of research - ie are largely interpretive in nature. The second type is work that presents a new analysis of existing data sets to answer questions that the original research did not set out to examine. This work is largely quantitative but is non-empirical in the sense that it does not involve data gathering. The Ofsted review noted a number of problems with non-empirical studies, including contradictory arguments, insubstantial literature reviews, going beyond the evidence in argument and the uncritical acceptance of the pronouncements of 'great thinkers'; particularly postmodernist thinkers such as Foucault and Lyotard. In NREC work, perhaps the most common problem has been the inadequacy of literature reviews. This is usually the result of an overwhelming focus on purely educational research and literature in a field that is increasingly interdisciplinary. Thus, a lack of understanding of labour market theory may result in an oversimplified discussion of youth transitions from education to work. Similarly, a lack of understanding of organisational theory and behaviour can lead to very unrealistic assessments of the role of employers in providing training to their workers. Labour market and organisational theory are well-developed fields of inquiry with their own voluminous literatures. In an interdisciplinary field such as VET, it is important that researchers have an understanding of what other research traditions have to offer in exploring the key issues and questions that beset the field.

Finally, Ofsted addressed the focus of the research - ie how the research relates to policy and practice. Here NREC has been successful in its demand side approach. The users of research, particularly at a policy level but increasingly with input from the practitioner community, set the research agenda for NREC so that it is increasingly relevant for both policy and practice. However, more can be done in this area. NREC research has tended to take a rather orthodox approach to research funding, with the bulk of projects funded for 12-18 months (with the exception of the shorter consolidation studies). This is both too short and too long a timeframe for VET research. On the one hand these projects present analyses of issues in a rather static way; research that takes place over a relatively short period of time and captures the essence of a problem or issue at a point in time – ie a snapshot approach to research. This does not allow for longitudinal approaches to issues so that data can be gathered over a period of time and chronological patterns discerned. On the other hand, the 12-18 month cycle is often too long for policy makers who have to react quickly to changes in the policy landscape, and need digests of research on critical issues to help guide the formulation of new approaches. Thus, what is needed is a bifurcation in the research effort. More long-term, longitudinal research needs to be undertaken to track the development of issues over periods of time so that the true patterns in phenomena can be discerned. At the same time, we need to be prepared to undertake short-run research, often synthesis work, that will help to gather together the lessons of research on particular topics that can be fed into the policy process described earlier.

In this sense we need a cumulative approach to VET research. Too often, research proposals tend to ignore work that has been completed elsewhere, leading to a duplication of research on issues of importance. More care needs to be taken to ensure that research proposals build on previous work, not duplicate it. Tools such as the VOCED research database, that captures research work quite efficiently, can play an important role in this process.

The new national research strategy to VET

The new national strategy, now published on the NCVER website (http://www.ncver.edu.au), attempts to come to terms with some of these issues (National Centre for Vocational Education Research 2001). The strategy directs the work of the NCVER and the National Research and Evaluation Committee. However, it also covers the broader field of VET research in Australia. The work programs of the four ANTA key centres/partners are described and the links to the work of NCVER/NREC discussed, so that a broad picture of the VET research effort is presented. The strategy covers the period from 2001-2003, coinciding with the ANTA national strategy for VET, *Bridge to the future*. The strategy defines 10 key areas for VET research:

1. The economics of vocational education and training
2. Lifelong learning and the social and community impact of VET
3. Innovation and the skills of the Australian workforce
4. Transitions from education to work
5. The vocational education and training provider
6. The quality of teaching and learning
7. Outcomes of vocational education and training
8. Equity in vocational education and training
9. International comparisons of vocational education and training
10. The future development of the VET sector.

The strategy concludes with a discussion of the international context of VET research. VET research is becoming increasingly internationalised. This reflects the importance that VET has assumed in the developed world in the last ten years, and increasingly in developing countries that are improving their skills base in order to foster industrial development. The impact of globalisation on labour markets means that Australia now competes for skilled labour directly with other countries. At the same time, Australia is increasingly an exporter of VET, particularly in the Asian region. Thus the VET system in this country is inextricably bound to developments in other countries. The activities of multinational corporations, which dominate much of the Australian economy, place demands on the VET system to meet their global requirements for skilled employees. As a result, governments throughout the world are looking to research and evaluation to underpin their responses to the key policy challenges in VET. Despite international differences in the operation of VET, these challenges are remarkably similar from one country to another and include:

- Improving transitions from education to work
- Reforming the financing of VET systems

- Creating flexibility in the provision of VET to meet the changing requirements of the labour market
- Improving the level of continuing training, especially that provided by enterprises
- Reforming systems of entry-level training
- Improving the provision of training for adult and older employees
- Responding to the emergence of lifelong learning.

These key areas feature in the VET research and evaluation programs of most countries, particularly in the developed world.

There is a strong tradition of comparative research in the social sciences in Australia. This is also true in VET research and evaluation. In recent years both ANTARAC and NREC have funded research that has attempted to put VET in Australia into an international perspective. There is a need to increase our comparative research activities to inform better policy development. But it is important to remember that comparative research is a two-way process; Australia has much to learn from other countries, but the rest of the world has also much to learn from developments in Australia. The significant international interest that continues to be shown in the Higher Education Contribution Scheme is a good example of the latter.

Australia also plays an important role in international agencies concerned with VET. Australia has been a key player in the development of UNESCO's technical and vocational education initiative, UNEVOC. There are three very active UNEVOC centres in Australia, which ensure that Australian VET research plays an increasingly important role in the international VET community. Australia also plays a significant role in the Organisation for Economic Cooperation and Development (OECD). The OECD has funded a number of very important and influential comparative research projects in the area of vocational education and training, and Australia has benefited from its participation in this large-scale comparative work.

Australian VET researchers and research centres are increasingly involved with their overseas counterparts. The formation of the International VET Association (IVETA), which held its annual conference in Sydney in 1999, is a good example of the growing international VET research community and of the important role that Australian researchers play in it. Many Australian VET research centres have established strong ties with similar centres overseas. NCVER has played an important role in this regard with its system of Memoranda of Understanding with key international VET research agencies, such as the South-East Asian Ministers for Education Organisation vocational education centre in Brunei (SEAMEO VOCTEC); Colombo Plan Staff College (CPSC) for Technician Education based in the Philippines; the Central Institute for Vocational and Technical Education in the People's Republic of China (CIVoTE); the Bundesinstut fur Berufsbildung (BIBB) in Germany; the European Centre for the Development of Vocational Training (CEDEFOP) of the European Union; and the Korean Research Institute for Vocational Education and Training (KRIVET). Such agreements lead to the exchange of research information and the development of joint comparative research between the centres. Many Australian VET researchers also maintain extensive links with international colleagues which form the basis for the increasing level of international VET research undertaken in Australia.

Australia now boasts a world-class national VET research and evaluation program. Fragmentation, disparate funding sources and a lack of national vision are often characteristics of much VET research carried out internationally. In Australia, the existence of a comprehensive national VET research funding program guided by a national research and evaluation strategy lends Australian VET research a level of coherence, relevance and consistency which is often lacking in overseas programs.

VET research in the future

We have discussed a number of changes that have occurred within VET research since the intervention of ANTA in the early 1990s. Research has become more thematic and less fragmented than in the past. The two national research strategies have identified themes and priorities around which research work has been organised in clusters, so that bodies of research work have been constructed around key questions for the VET sector. The four key research centres/partners have also developed a theme-based approach to research with their workplaces organised around key themes and questions, such as vocational learning in the case of RCVET, or the experiences of students in the VET system in the case of the Centre for Post-compulsory Education and Training.

Cycle times for research are also slowly changing. The traditional 12-18 month project-based model of educational research suits neither the needs of the busy policy-maker and practitioner nor the need for in-depth investigation of important issues over long periods of time. Snapshot research only leads inevitably to conclusions that stress the importance of more research and more funding for the individuals suggesting it. Longer-term and longitudinal research programs need to become more typical of our empirical work. A good example of this is the field of apprenticeships and traineeships which has been a major theme for NREC and NCVER research in the last 18 months. This cluster of work has produced some remarkable insights into the strengths and the weaknesses of Australia's apprenticeship system, but it has also clearly shown that key areas in which research is lacking is in the tracking of apprentices and trainees through their training and later in the workforce. We need to know more about what happens to those who graduate from the system, so that we can speak with confidence on the career prospects for apprentices and trainees and how they compare with other forms of education and training.

Research is also becoming more collaborative. Large research teams are now becoming standard in NREC projects. The numbers of projects carried out by sole researchers or by small groups of two or three are disappearing and being replaced by larger teams of researchers drawn from an increasingly diverse background. NREC, as ANTARAC before, has encouraged this development over the years. Collaboration is now cross-institutional with different research groups and centres regularly working together on projects that draw upon their collective expertise. Research is increasingly cross-sectoral as discussed earlier in this paper, with researchers from the VET sector working with consultants and university-based researchers on projects that cross institutional and sectoral boundaries. Research is also, slowly, becoming internationalised. Most VET research centres and groups around the country have developed international links with similar groups overseas in recent years. Some recent NREC research has drawn on international comparisons

and has involved researchers from different countries collaborating to produce more internationalised commentaries on key questions for VET. However, collaboration - though it may enable a wide range of different skills to be brought to bear on research - brings its problems. The management of collaborative teams, particularly those scattered over long geographical distances or involving researchers from different institutional backgrounds, can be very difficult and demand new levels of project management skills from researchers.

This latter point highlights the changing nature of research work itself. In recent years much VET research has highlighted the significance of the changing nature of work for the policy and practice of VET. Some of the key findings about the way in which work is changing include:

- The increasing globalisation of the labour market
- The increasing casualisation and outsourcing of work
- The changes in organisational forms to produce an emphasis on teamwork
- The decentralisation of management functions to other workers
- The demand for new skills other than job competency, including communication skills, ability to work with others, problem-solving etc.

Each one of these changes can also be traced in the world of research work. As noted above, research work is also becoming more globalised. Research is no longer, if it ever was, carried on by the full-time professional researcher. Many of those involved in research are undertaking this work as part of a range of other tasks in which they are involved. Many researchers are employed on a casual basis and an increasing amount of research work is outsourced to those with specific sets of skills. Also, as we have already noted, research work is becoming more collaborative and team-based, and this gives rise to an increasing demand for effective project management. Researchers are no longer specialised experts bringing their skills to bear on interesting problems, but are increasingly managing the specialised work of others, with the final responsibility for bringing the project together in a way that meets the needs of the research funding body. This calls for new sets of skills beyond those of the traditional researcher. Researchers need to be able to use a variety of research methods – crossing the quantitative/qualitative divide. They need to be able to work with funding bodies and other clients to produce research that is focused on research need. They need to able to communicate with a wide variety of audiences in ways other than writing for academic journals, so that the research has impact.

These define a much broader set of skills for the VET researchers than those taught in the traditional training programs for researchers, such as PhD programs at universities. These programs, which still dominate our thinking on research training, produce highly specialised researchers with only a limited set of technical research skills and a highly specialised content knowledge in what could be described as an apprentice/craftsperson model of research. In many cases, however, the 'new' researcher needs a different , sometimes opposite, set of skills. Table 5 sets out the

skill differences between the apprentice/craftsperson researcher and the new researcher.

Table 5: The old and new researcher

Apprentice/craftsperson	New researcher
Discipline based	Interdisciplinary
Specialist knowledge	Generalist within a discipline area
Skilled in one method	Able to use multi-methods
Self-management	Able to manage others and their work
Focused on development of theory	Focused on relevance to policy and practice
Purist	Negotiator/optimiser
Academic writing skills	Broad-based communicator
Meet standards of peer review	Meet standards demanded by users

Outside the PhD program there are no real research training routes. Many involved in VET research have come to research from other careers without much formal research training. Many have the qualities and skills of the new researcher, but by accident rather than design. Our formal research training programs in the universities continue to produce the specialised academic rather than the multi-skilled researcher that the field increasingly demands. Few of these graduates have the skills necessary to acquire research funding and make a serious contribution to VET research. This is not to mention the highly variable quality of the research that is produced though PhD programs, which renders any notion of standards in research training unusable in a practical sense.

Thus, the VET research community faces a challenge in developing the next generation of researchers. The research on the changing nature of work and lifelong learning also highlights the importance of demographic change in driving changes to education and training. This is also true in research. The VET research community is greying and it is not clear where the next generation of researchers will come from. This confounds the problem of the research training that sector also faces. An important function for AVETRA in the coming years will be the ability to identify new pathways for emerging researchers and fashion programs of research training that teach researchers the real skills that they will need to become the research leaders of the next generation.

Conclusion

This paper has outlined some of the more important changes that have occurred in VET research in recent years. In general, increased funding through ANTA has been highly successful at increasing the overall quantum of research. But it is the quality of that research that will determine whether governments continue to fund the research effort.

Relevance, timeliness, objectivity and methodological integrity are the hallmarks of high quality research in applied fields such as VET. This involves both users and researchers becoming much more involved with the research management process. Users need to clear about what issues need to addressed and the standards they expect from that research. Researchers need to examine their own practices to ensure that research is meaningful and builds on the work of others. This more demanding regime for VET research demands new skills from researchers and the development of research training programs that ensure the continuing supply of those skills into the VET research community.

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